Text-fig. 1.—Meiosis, microspore mother cell, *Drimys insipida*. Camera lucida drawing of metaphase I showing 13 bivalents. ×2600.

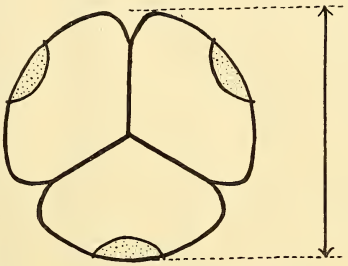
Text-fig. 2.—Mitosis, tapetal cell, *Drimys insipida*. Camera lucida drawing of metaphase showing 104 chromosomes (8 × 13). ×2600.

Text-fig. 3.—Meiosis, microspore mother cell. *Drimys purpurascens*. Camera lucida drawing of anaphase I showing 13 chromosomes. ×2600.

Text-fig. 4.—Meiosis, microspore mother cell, *Drimys stipitata*. Camera lucida drawing of a portion of anaphase II showing 13 chromosomes. ×2600.

number in this group (Pl. i, fig. 1; Text-figs. 1, 3, 4). In the material of *D. insipida* several polar views of metaphase plates in tapetal cells were encountered, one of which (Pl. i, fig. 2; Text-fig. 2) had exactly 104 chromosomes, a multiple of 13. Permanent slides have been made of material from all species except *D. lanceolata*.

The Winteraceae have long been regarded as a family of distinct significance in any account of the morphology and phylogeny of the Angiosperms. A recent paper by Bailey and Nast (1945) summarizes this viewpoint. The chromosomes have been studied previously in only one species of the family. Whitaker (1933) reported the somatic chromosome number from root tips of *Drimys winteri* to be ± 76 (4×19). He stated that, "because of the large number of chromosomes and their small size, it is difficult to make absolutely certain of the number. However, it is undoubtedly between 72 and 76, with greater likelihood of the latter figure's being correct." This conclusion seemed to be in agreement with a report by Strasburger (1905) that there were about 36 pairs of chromosomes in this species and also with the base number 19 in *Magnolia*.



Text-fig. 5.—Diagram of pollen tetrad showing the diameter measured for Table 2.

It is suggested here that the somatic chromosome number in the plants counted by Strasburger and Whitaker may have been 78, a multiple of 13. In any case, although the American species should be reinvestigated for exact chromosome number, the presence of polyploidy seems to be well established in that section of *Drimys*.

Whitaker postulated that the basic chromosome number 19, together with nodal anatomy common to *Magnolia*, *Liriodendron*, *Cercidiphyllum*, *Drimys*, *Trochodendron* and *Tetracentron*, was strong evidence for regarding this list of genera as forming a natural grouping of plants.

Subsequent workers, in intensive reinvestigations in the anatomy and morphology of these genera, have separated *Drimys* (and the Winteraceae as a whole) from immediate relationship with any of the other genera, thus leaving the Winteraceae as an isolated, relic group of general ranalian affinities (Bailey and Nast, 1945; Nast and Bailey, 1945; Swamy and Bailey, 1949; Canright, 1953). The establishment of 13 as the basic chromosome number in *Drimys* removes the putative connections founded on chromosome number between the genus and the other genera in Whitaker's list, and concurs with the findings of the recent investigators in this field.

It may be reported here also that during this study it was observed that in the four (Australian) species of *Drimys* counted, the course of development in the stamens is centrifugal. This development was noted particularly in the meiosis of the microspore mother cells. Studies to show the complete ontogeny of the stamens have not yet been undertaken. The centrifugal development of stamens when it is better understood may prove to be a specialization of considerable significance in the phylogeny of the Angiosperms and its presence in the Winteraceae is of great interest.

Bailey and Nast (1945) and Smith (1945) emphasize the separation of the Old and New World Sections of *Drimys* in both space and time, and point out that for many

TABLE 2.

Pollen Tetrad Size in the Winteraceae.

Species.	Diameter in Micra.	Measured by.	Collector.
DRIMYS.			
Section *Tasmannia*.			
D. brassii	37	I.W.B.	Brass 10126.
D. buxifolia	30	I.W.B.	Brass 4239.
D. hatamensis	35	I.W.B.	Clemens 4625.
D. hatamensis	30	I.W.B.	Kan. *et* Hat. 13935.
D. insipida	37	I.W.B.	C. T. White 6062.
D. insipida (dipetala)	35	I.W.B.	?
D. insipida	30	A.T.H.	Hotchkiss 98.
D. insipida	30	A.T.H.	Hotchkiss 99.
D. lanceolata	40	I.W.B.	Baker 1890.
D. lanceolata	35	I.W.B.	F. V. Muell.
D. lanceolata	30	A.T.H.	Hotchkiss 97.
D. macrantha	32	I.W.B.	Brass 4519.
D. microphylla	30	I.W.B.	Brass 12006.
D. membranacea	32	I.W.B.	F. V. Muell.
D. membranacea	42	I.W.B.	Kajewski 1291.
D. arfakensis	30	I.W.B.	Kan. *et* Hit. 13408.
D. beccariana	35	I.W.B.	Brass 11298.
D. oborata	35	I.W.B.	Brass 10570.
D. obovata	32	I.W.B.	Brass 11295.
D. oligandra	32	I.W.B.	Brass 12975.
D. piperita	32	I.W.B.	Elmer 9912.
D. piperita	30	I.W.B.	Griswold 48.
D. piperita	32	I.W.B.	Ramos 19583.
D. piperita	32	I.W.B.	Williams 754.
D. purpurascens	30	A.T.H.	Ashby.
D. rubiginosa	30	I.W.B.	Brass 12629.
D. stipitata	35	I.W.B.	Marden & Forsyth 9806.
D. stipitata	37	I.W.B.	C. T. White 7572.
D. stipitata	35	I.W.B.	?
D. stipitata	35	A.T.H.	Hotchkiss 102.
Section *Wintera*.			
D. brasiliensis var. *campestris*	45	I.W.B.	Barreto 7451.
D. brasiliensis var. *campestris*	45	I.W.B.	Barreto 7452.
D. brasiliensis var. *campestris*	47	I.W.B.	Burchell 3567.
D. brasiliensis var. *campestris*	47	I.W.B.	F.M. 1024474.
D. brasiliensis var. *campestris*	50	I.W.B.	Dusen 14504.
D. brasiliensis var. *campestris*	45	I.W.B.	Gardener 4402.
D. brasiliensis var. *campestris*	47	I.W.B.	Hassler 10586.
D. brasiliensis var. *campestris*	42	I.W.B.	Hoehne 1205.
D. brasiliensis var. *campestris*	45	I.W.B.	Hoehne 3839.
D. brasiliensis var. *campestris*	50	I.W.B.	Hoehne 28700.
D. brasiliensis var. *campestris*	45	I.W.B.	Mexia 5791.
D. brasiliensis var. *campestris*	47	I.W.B.	U.S. 1392709.
D. brasiliensis var. *retorta*	42	I.W.B.	Barreto 9083.
D. fernandiana	40	I.W.B.	Mosly.
D. granadensis var. *chiriquiensis*	42	I.W.B.	Davison 127.
D. granadensis var. *grandiflora*	45	I.W.B.	Archer 1202.
D. granadensis var. *grandiflora*	52	I.W.B.	Balls 5749.
D. granadensis var. *grandiflora*	45	I.W.B.	Cuatrecasas 6687.
D. granadensis var. *grandiflora*	50	I.W.B.	Holton 673.
D. granadensis var. *grandiflora*	50	I.W.B.	A. Joseph A106.
D. granadensis var. *grandiflora*	50	I.W.B.	Killip & Smith 17817.
D. granadensis var. *mexicana*	47	I.W.B.	Ghiesbright 518.
D. granadensis var. *mexicana*	50	I.W.B.	Hinton 1444.
D. granadensis var. *mexicana*	47	I.W.B.	Matuda 4287.
D. granadensis var. *mexicana*	45	I.W.B.	Pittier 7338.
D. granadensis var. *mexicana*	45	I.W.B.	Skutch 3585.
D. granadensis var. *mexicana*	45	I.W.B.	D. Smith 7342.
D. granadensis var. *mexicana*	47	I.W.B.	Stanley 39058.
D. granadensis var. *mexicana*	45	I.W.B.	Tonduz 12174.
D. winteri var. *andina*	47	I.W.B.	Cabera 268.